Opera, and distributed skilfully in several favourable sites of a large park having a surface of 80 acres.

The smaller meridian circle by Gauthier is in its place, and can be used for daily determinations. The large meridian circle by Brünner will be finished in the first month of 1882. The object glass has 8 inches diameter, and has been focussed to a distance of 10 feet. The smaller equatorial with an object-glass of 14 inches, and focussed to 27 feet, has been made by Eichens, and will be ready for observations at the same time as the larger meridian circle. The larger equatorial will have an object-glass of 28 inches, and will be focussed to 52 feet. The glasses have been made by Feil; Henry Brothers are polishing them. The instrument will be constructed by Eichens and Gauthier. The work is proceeding favourably, but it is impossible to state when it will be completed.

M. Lœwy, sub-director of the Paris Observatory, has designed an apparatus for preventing the perturbations produced by the flexion of the axis when observations are taken at a large angular distance from the zenith. The building will have a diameter of sixty-four feet, with a rotating roof of copper, worked by hand-machinery, as designed by Gardiner.

The Bischoffsheim observatory will not be confined to astronomical observations. The donor having been taught by Leverrier in astronomy has felt it a duty to extend his donation to magnetical and meteorological observations, too often neglected in French observatories. A magnetical pavilion has been built with extensive cellars, for continuous self-registering apparatus. The registration takes place by photography as in Kew, and is made with instruments by Adie, the maker of the Kew set of registers. As in Kew, a "rez-de-chaussée" has been built for direct force and direction observations. The instruments have been made by Brunner.

The installation of the meteorological instruments has been made under the direct supervision of M. Mascart, the director of the French Meteorological Office. A constant staff has been selected by M. Bischoffsheim, and is now on duty. The direction has been given to M. Perrotin, formerly assistant astronomer to M. Tisserand when he was director of Toulouse Observatory. The assistant astronomer is M. Carvallo, formerly a pupil in the Polytechnic School, and who has taken his astronomical honours in the special school established by Rear-Admiral Mouchez at the Paris Observatory. M. Puiseux, formerly pupil of the Polytechnic School, will have the control of magnetical and meteorological observations.

Two houses have been built—one for the administration and the other for the direction. The first floor of this staircase has been fitted up entirely for boarding foreign astronomers who are desirous of making observations in this magnificent astronomical "caravanseraï." M. and Mdme. Struve and M. Tachini have promised already to spend some time there next winter.

It should be noted that it was probably in a tour made in England with Leverrier, when the great astronomer was made an honorary doctor of Cambridge University, that M. Bischoffsheim meditated on the opportunity of establishing an observatory entirely of his own. Up to that time he had spent his time in the observation of stars which shine in a less elevated sphere than the heavenly skies. But Leverrier's conversation and intimacy led him to appreciate other unfading beauties.

The Bureau des Longitudes has agreed to take possession of the observatory, which will be handed over to it with a sufficient endowment to keep it decently. It is estimated that the money spent in purchasing the estate, &c., will exceed 120,000*l.*, and that the endowment will be more than 2000*l.* a year. This handsome donation must be noted as being a revolution in French generosity towards science. Up to this time our neighbours confined themselves to bequeathing legacies and lavishing posthumous generosities.

FOSSIL FLORA OF SUMATRA[1]

THIS is a paper of some twenty pages and six plates. Herr Verbeek sent in 1874 a small collection of fossil plants from Sumatra to Switzerland, which were described by Heer, and in the following year the second collection, now described, was received, no others having been found in the interval. The plates contain twenty-two figures, most of them representing fragments of simple ovate leaves, supposed, with two exceptions, to be allied to existing species of the Indian mainland or archipelago. The mollusca in the overlying strata point to an Eocene age. The exceptions are a Eucalyptus and a small leaflet ascribed to Cassia, and now represented, it is here supposed, by *C. lævigata* of tropical America, but the determination rests on slender grounds. The majority of them, in fact, though doubtless the best that could be made from such material, must necessarily be almost mere guesses. The value of such guesses may be inferred from a similar work by the same author on the fossil flora of Madeira.

In this case several of the commonest indigenous plants of Madeira were referred to extra-Madeiran plants. For instance, the terminal leaflets of *Rubus discolor* were referred to *Corylus australis*, and various leaflets of *Rubus grandiflora* are figured as *Corylus australis*, *Ulmus suberosa*, and *Psoraleadentata;* the so-called *Pistacea Phœacum* is the common myrtle, the *Ilex Hartingi* is the Madeira *Vaccinium*, and the figures of *Myrica Faya* belong to *Ardisia excelsa*. In this case the mistakes are the more singular, as Prof. Heer had actually sojourned in Madeira, and the plants are the commonest on the island. If with even exceptionally favourable circumstances such mistakes can be made, generalisers should surely be cautious in building theories upon the ages of formations, &c., when they have been determined upon the evidence of fossil plants. It is unfortunate that on evidence as trivial, and even more questionable, we read in Lyell of the MIOCENE outbursts of Mull, of Iceland, and Greenland, of the MIOCENE deposits of Bovey Tracy, &c.

It is important, however, that fossil plants should be figured and described, for if the generic and specific names, except when based on ample material, are regarded merely as an individual opinion, the determinations become of use. Whatever is unsatisfactory in the work is inherent to the subject, for few possess the zeal and untiring industry of Heer. If he would only make clear to his readers the reasons which enable him in his own mind to determine the genus to which an ordinary type of leaf, with neither top nor base, belongs, and would be less positive where nothing positive is possible, his works would acquire a scientific value which some justly think they hardly at present possess. J. S. G.

THE VOYAGE OF THE "VEGA"[2]

II.

BARON NORDENSKJÖLD frequently refers to what Mr. Leslie renders "self-dead" animals, meaning animals that have died a natural death, in distinction to those that have been killed by hunters or by other animals. The rarity of such "self-dead" animals is remarkable, especially along the north coast of Asia, where there are few hunters and fishers, and where immense numbers of animals must die. While sailing along the Taimur coast, large numbers of dead fish (*Gadus polaris*) were seen lying on a block of ice, and strewed along the bottom of the sea, which Baron Nordenskiöld notices as being very unusual.

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[1] By Dr. Oswald Heer (*Neue Denkschriften der schweizerischen Gesellschaft*, vol. xxviii. Zürich, 1881).

[2] "The Voyage of the *Vega* round Asia and Europe; with a Historical Review of previous Journeys along the North Coast of the Old World." By A. E. Nordenskjöld. Translated by Alexander Leslie. Five steel portraits, numerous maps and illustrations. Two vols. (London: Macmillan and Co., 1881.) Continued from p. 183.

"They had probably perished from the same cause, which often kills fish in the river Ob in so great numbers that the water is infected, namely, from a large shoal of fish having been inclosed by ice in a small hole, where the water, when its surface has frozen, could no longer by absorption from the air replace the oxygen consumed, and where the fish have thus been literally drowned. I mention this inconsiderable *find* of some self-dead fish, because self-dead vertebrate animals, even fish, are found exceedingly seldom. Such *finds* therefore deserve to be noted with much greater care than, for instance, the occurrence of animal species in the neighbourhood of places where they have been seen a thousand times before. During my nine expeditions in the Arctic regions, where animal life during summer is so exceedingly abundant, the case just mentioned has been one of the few in which I have found remains of recent vertebrate animals which could be proved to have died a natural death. Near hunting-grounds there are to be seen often enough the remains of reindeer, seals, foxes, or birds that have died from gun-shot wounds, but no self-dead Polar bear, seal, walrus, white whale, fox, goose, auk, lemming or other vertebrate. The Polar bear and the reindeer are found there in hundreds, the seal, walrus, and white whale in thousands, and birds in millions.[1] These animals must die a "natural" death in untold numbers. What becomes of their bodies? Of this we have for the present no idea, and yet we have here a problem of immense importance for the answering of a large number of questions concerning the formation of fossiliferous strata. It is strange in any case that on Spitzbergen it is easier to find vertebræ of a gigantic lizard of the Trias, than bones of a self-dead seal, walrus, or bird, and the same also holds good of more southerly inhabited lands."

Another problem of great importance is suggested by the finding of some yellow specks on the snow of the Taimur coast, which turned out to be carbonate of lime of an unusual form of crystallisation, and which the Baron believes were probably of interplanetary origin. He gives a brief sketch of his previous observations in the high north on this subject, referring also to what has been done by M. Tissandier, and during the last English polar expedition, and to the special suitability of the uninhabited Arctic regions for the collection of what is believed to be cosmic dust. It is certainly a subject which deserves the attention of future expeditions, and especially of the polar observing stations which are in a fair way of being established.

"It may appear to many that it is below the dignity of science to concern one's self with so trifling an affair as the fall of a small quantity of dust. But this is by no means the case. For I estimate the quantity of the dust that was found on the ice north of Spitzbergen at from 0·1 to 1 milligram per square metre, and probably the whole fall of dust for the year far exceeded the latter figure. But a milligram on every square metre of the surface of the earth amounts for the whole globe to five hundred million kilograms (say half a million tons)! Such a mass collected year by year during the geological ages, of a duration probably incomprehensible by us, forms too important a factor to be neglected, when the fundamental facts of the geological history of our planet are enumerated. A continuation of these investigations will perhaps show, that our globe has increased gradually from a small beginning to the dimensions it now possesses; that a considerable quantity of the constituents of our sedimentary strata, especially of those that have been deposited in the open sea far from land, are of cosmic origin; and will throw an unexpected light on the origin of the fire-hearths of the volcanoes, and afford a simple explanation of the remarkable resemblance which unmistakably exists between plutonic rocks and meteoric stones."[1]

After leaving Cape Chelyuskin, the *Vega* sailed for a considerable distance over what, in existing maps, is set down as land; and although there was necessarily little time for accurate surveying, still it will be found that the expedition has done much to render accurate the geography of the north coast of Asia. After sailing down the east side of the Taimur Peninsula, close by the land, the vessel was directed almost straight eastwards towards the most southerly of the New Siberian Islands, still keeping as near the coast of the mainland as practicable. Off the delta of the Lena, which within the last week has come so prominently before us in connection with the *Jeannette* expedition, the *Vega* parted with the *Lena*, which entered the river, to establish regular traffic by steamer. It was only after leaving Cape Chelyuskin that ice in any quantity was met with so as to hamper the progress of the vessels, and Baron Nordenskjöld states that had the coast-water been better known so that he could have kept closer to land, the latter part of the voyage would have been as free from obstruction as the former.

Here follows an interesting chapter on the commercial navigation of the great Siberian rivers, and on the geography and economical condition of Siberia. It contains indeed a summary of all that is known to science of the immense country, with much that is the result of Baron Nordenskjöld's own research or observations, and with speculations on geology that are not likely to be let pass unchallenged. The *Lena* had some difficulty in navigating the delta of the river, for the old maps of 140 years ago were useless, the changes at the mouth of the river in that time has been so great. The Baron draws an interesting parallel between Siberia and America north of the 40th parallel.

He then gives a sketch of his own journey up the Yennissi in 1875, in connection with which we give a view on that river (Fig. 7).

"As is the case with all the other Siberian rivers running from south to north,' the western strand of the Yenisej, wherever it is formed of loose, earthy layers, is also quite low and often marshy, while on the other hand the eastern strand consists of a steep bank, ten or twenty metres high, which north of the limit of trees is distributed in a very remarkable way into pyramidal pointed mounds. Numerous shells of crustacea found here, belonging to species which still live in the Polar Sea, show that at least the upper earthy layer of the *tundra* was deposited in a sea resembling that which now washes the north coast of Siberia.

"The *tundra* itself is in summer completely free of snow, but at a limited depth from the surface the ground is continually frozen. At some places the earthy strata alternate with strata of pure, clear ice. It is in these frozen strata that complete carcases of elephants and rhinoceroses have been found, which have been protected from putrefaction for hundreds of thousands of years. Such *finds*, however, are uncommon, but on the other hand single bones from this primeval animal world occur in rich abundance, and along with them masses of old drift-wood, originating from the Mammoth period, known by the Russian natives of Siberia under the distinctive name of 'Noah's wood.' Besides there are to be seen in the most recent layer of the Yenesej *tundra*, considerably north of the present limit of actual trees, large tree-stems with their roots fast in the soil, which show that the limit of trees in the Yenesej region, even during our geological period, went further north than now, perhaps as far as, in consequence of favourable local circumstances, it now goes on the Lena.

"On the slopes of the steep *tundra* bank and in several of the *tundra* valleys there is an exceedingly rich vegetation, which already, only 100 kilometres south of Yefremo-Kamen, forms actual thickets of flowering plants, while the *tundra* itself is overgrown with an exceedingly scanty carpet, consisting more of mosses than of grasses. Salices of little height go as far north as Port Dickson (73° 30′ N.L.), the dwarf birch (*Betula nana*, L.) is met with, though only as a bush creeping along the ground, at Cape Schaitanskoj (72° 8′ N.L.); and here in 1875, on the ice-mixed soil of the *tundra*, we gathered ripe cloudberries. Very luxuriant alders (*Alnaster fruticosus*, LEDEB.) occur already at Mesenkin (71° 28′ N.L.), and the Briochov Islands (70° to 71° N.L.) are in several places covered with rich and luxuriant thickets of bushes. But the limit of trees proper is considered to begin first at the great bend which the river makes in 69° 40′ N.L., a little north of Dudino. Here the hills are covered with a sort of wood consisting of half-withered, grey, moss-grown

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[1] I can remember only one other instance of finding self-dead vertebrate animals, viz. when in 1873, as has already been stated (p. 110), I found a large number of dead rotges on the ice at the mouth of Hinloopen Strait.

[1] Namely, by showing that the principal material of the plutonic and volcanic rocks is of cosmic origin, and that the phenomena of heat, which occur in these layers, depend on chemical changes to which the cosmic sediment, after being covered by thick terrestrial formations, is subjected.

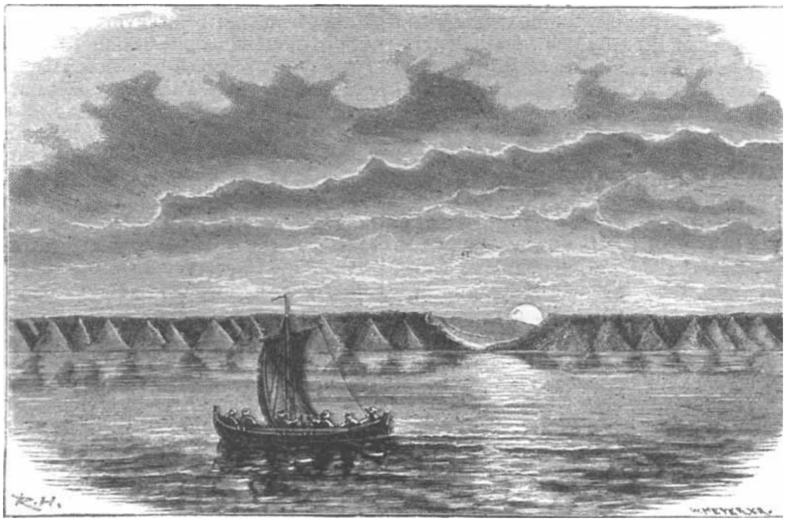

FIG. 7.—River view on the Yennissi.

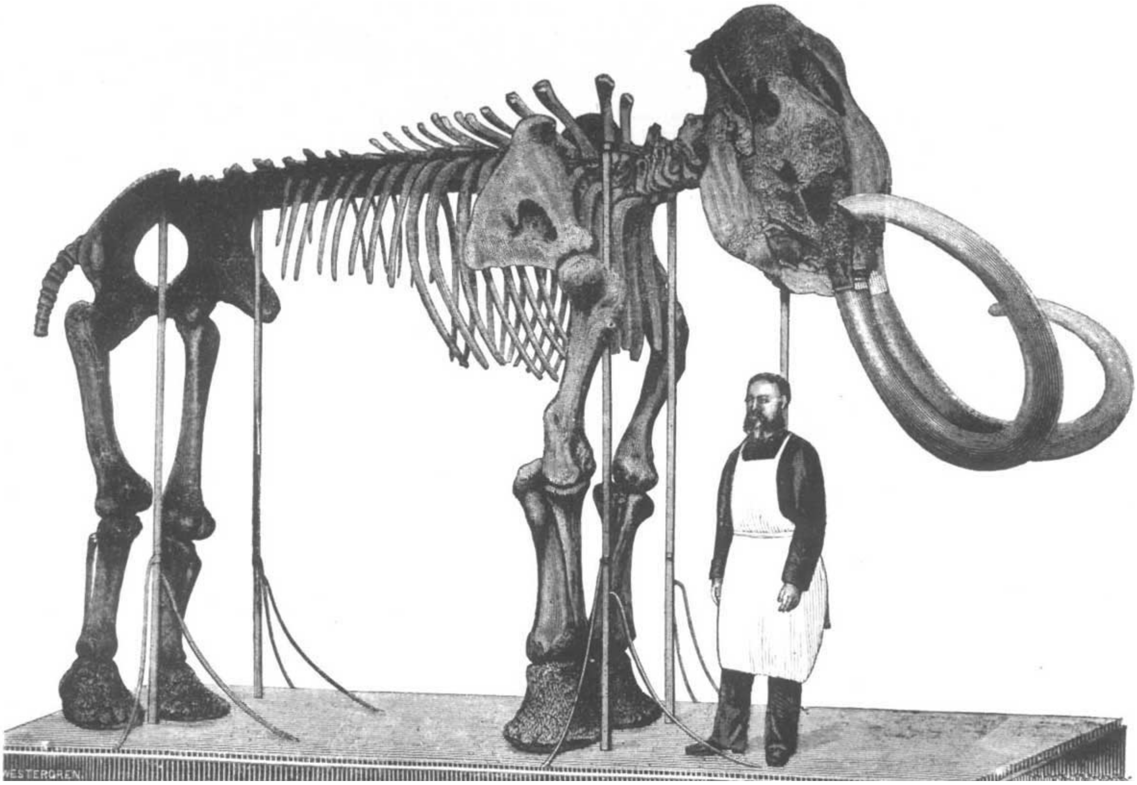

FIG. 8.—Mammoth Skeleton in the Imperial Museum of the Academy of Sciences in St. Petersburg.

larches (*Larix sibirica*), which seldom reach a height of more than seven to ten metres, and which much less deserve the name of trees than the luxuriant alder bushes which grow nearly 2° farther north. But some few miles south of this place, and still far north of the Arctic Circle, the pine forest becomes tall. Here begins a veritable forest, the greatest the earth has to show, extending with little interruption from the Ural to the neighbourhood of the Sea of Ochotsk, and from the fifty-eighth or fifty-ninth degree of latitude to far north of the Arctic Circle, that is to say, about one thousand kilometres from north to south, and perhaps four times as much from east to west. It is a primeval forest of enormous extent, nearly untouched by the axe of the cultivator, but at many places devastated by extensive forest fires.

"On the high eastern bank of the Yenisej the forest begins immediately at the river bank. It consists principally of pines: the cembra pine (*Pinus Cembra*, L.), valued for its seeds, enormous larches, the nearly awl-formed Siberian pine (*Pinus sibirica*, Ledeb.), the fir (*Pinus obovata*, Turcz.), and scattered trees of the common pine (*Pinus sylvestris*, L.). Most of these already north of the Arctic Circle reach a colossal size, but in such a case are often here, far from all forestry, grey and half-dried up with age. Between the trees the ground is so covered with fallen branches and stems, only some of which are fresh, the others converted into a mass of wood-mould held together only by the bark, that there one willingly avoids going forward on an unbroken path. If that must be done, the progress made is small, and there is constant danger of breaking one's bones in the labyrinth of stems. Nearly everywhere the fallen stems are covered, often concealed, by an exceedingly luxuriant bed of mosses, while on the other hand tree-lichens, probably in consequence of the dry inland climate of Siberia, occur sparingly. The pines, therefore, want the shaggy covering common in Sweden, and the bark of the birches which are seen here and there among the pines is distinguished by an uncommon blinding whiteness."

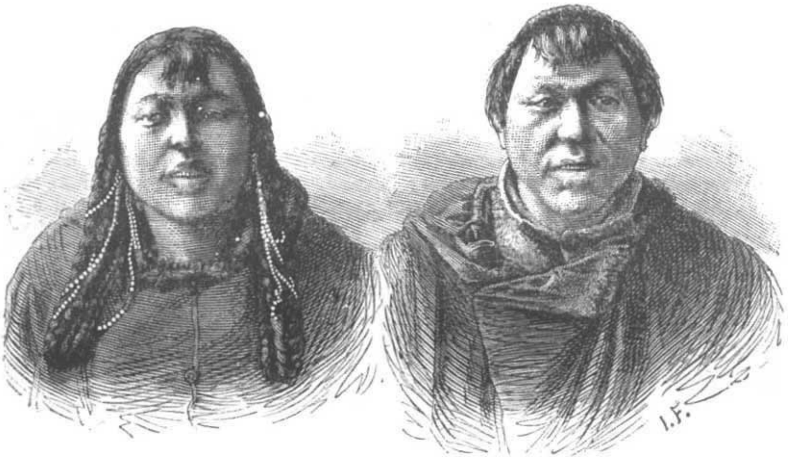

FIG. 9.—Notti and his wife Aitanga.

After parting with the *Lena* the *Vega* made for the New Siberian Islands, of great interest to science on account of the abundant remains of the extinct mammoth found thereon. "We know by the careful researches of the Academicians Pallas, von Baer, Brandt, von Middendorf, Fr. Schmidt, &c., that the mammoth was a peculiar northern species of elephant with a covering of hair, which, at least during certain seasons of the year, lived under natural conditions closely resembling those which now prevail in middle and even in northern Siberia. The widely extended grassy plains and forests of North Asia were the proper homeland of this animal, and there it must at one time have wandered about in large herds." The mammoth remains the Baron shows are derived from a gigantic animal form, living in former times in nearly all the lands now civilized, and whose carcase is not yet everywhere completely decomposed. Hence the great and intense interest which attaches to all that concerns this wonderful animal (Fig. 8).

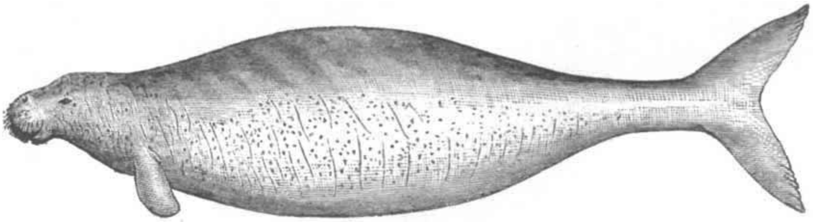

FIG. 10.—Reconstructed form of the sea-cow.

Baron Nordenskiöld then gives an interesting account of all the leading mammoth finds from the earliest period down to the present day. Portions of skeletons of other animal forms have been found in considerable numbers in the New Siberian Islands, and also certain remarkable "wood-hills," highly enigmatical as to their mode of formation.

"These hills are sixty-four metres high, and consist of thick horizontal sandstone beds alternating with strata of fissile bituminous tree stems, heaped on each other to the top of the hill. In the lower part of the hill the tree stems lie horizontally, but in the upper strata they stand upright, though perhaps not rootfast.[1] The flora and fauna of the island group besides are still completely unknown, and the fossils, among them ammonites with exquisite pearly lustre, which Hedenström brought home from the rock strata on Kotelnoj Island, hold out inducement to further researches, which ought to yield the geologist valuable information as to the former climate and the former distribution of land and sea on the surface of the globe."

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[1] Hedenström, *loc. cit.* p. 128. To find stranded driftwood in an upright position is nothing uncommon.

In connection with the state of the ice and the sea here, and the absence of glaciers on the coast, Baron Nordenskiöld gives a classified account of what he deems the various forms of ice. We can only here give a list of the various forms, referring the reader to the book itself for details. We have (1) icebergs, (2) glacier ice-blocks, (3) pieces of ice from the ice-foot; (4) river-ice; (5) bog-ice; (6) sea-ice or heavy ice. After passing Cape Chelgaskoi, on the east of Chaun Bay, on September 6, progress became much slower, and they had become heartily tired of "new ice, shallow water, and fog, and fog, shallow water, and new ice." Here for the first time since leaving Yugor Schar, signs of humanity were seen in the shape of some Chukchi natives who came out to the ship in their boats. A detention of six days at Cape Irkaipi (180° east longitude) afforded an opportunity for examining the games of the race known as Onkilon, who formerly inhabited these regions, and some centuries ago were driven by the Chukchis, according to tradition, to some remote islands in the polar sea. Kolyuchin Bay, just at the north entrance to Behring Strait, was reached on September 28, and just beyond it, and a mile from the shore, the *Vega* was caught in the ice and detained for ten months, till July 18, 1880. It was only after the lapse of some time that the expedition realised that they were caught at last, and serious preparations made for spending the winter. Meteorological and astronomical observatories were erected on shore, and a well-arranged method adopted for carrying out observations of various kinds. To some of the specially scientific results we shall probably refer in separate articles, and particularly to the interesting auroral observations both here and during other expeditions under the guidance of Baron Nordenskjöld. Some accurate notes as to ice-measurements are given in the neighbourhood of the *Vega's* winter quarters, which we give here, as statements on the subject are sometimes so vague.

"When it had become evident that we could make no further advance before next year, Lieut. Brusewitz occasionally measured the thickness of the newly formed ice, with the following results :

THICKNESS OF THE ICE.

1 Dec.	56 centimetres.	1 May,	154 centimetres.
1 Jan.	92 ,,	15 ,,	162 ,,
1 Feb.	108 ,,	1 June,	154 ,,
15 ,,	120 ,,	15 ,,	151 ,,
1 Mar.	123 ,,	1 July,	104 ,,
1 April	128 ,,	15 ,,	67 ,, (full of holes).
15 ,,	139 ,,	18 ,,	The ice broke up."

"The exact position of the *Vega* was 67° 4′ 49″ north latitude, and 173° 23′ 2″ west longitude. The dietary and hygienic arrangements were such that no trace of scurvy occurred during the whole winter, and no illness to speak of.

"The greatest cold which was observed during the different months was in

Oct. the 24th—20°·8	March the 29th—39°·8
Nov. the 30th—27°·2	April the 15th—38°·0
Dec. the 23rd—37°·1	May the 3rd—26°·8
Jan. the 25th—45°·7	June the 3rd—14°·3
Feb. the 2nd—43°·8	July the 2nd—1°·0

"Twice we had the barometer uncommonly high, viz.:

On the 22nd December 6 A.M. 782·0 (0°) mm.
On the 17th February 6 A.M. 788·1 (0°) mm.

"The lowest atmospheric pressure, 728·8 (0°) mm., occurred on the 31st December at two o'clock P.M."

The ship was beset in the neighbourhood of a number of Chukchi encampments, and with the natives the most friendly intercourse was kept up during the whole year. Chukchi trading parties from a distance passing on to trade in one of the islands in the strait, made the *Vega* a regular place of call, and thus a great amount of information was gathered from these people of much ethnological value. They have evidently no connection with the Eskimo, whose origin must be sought within the American continent itself. The Chukchis would seem to have been driven up to their present inhospitable abodes a few centuries ago, by commotions in Central Asia; and when the Russians first came into contact with them they were found to be a brave and warlike race whom it was very difficult to subdue. At present they are quiet, harmless, good-natured, and dirty, some having flocks of reindeer and living inland, while the coast Chukchis live largely by fishing. Lieutenant Nordquist learned the language of the people, and was thus able to have important intercourse with them. Large collections were made of their clothing, implements, weapons, utensils, &c., as also of their drawings, for like the Eskimo they have a wonderful capacity for art of a rude and elementary but genuine kind. We give on the preceding page the portraits of a Chukchi and his wife, of such portraits the volume contains many (Fig. 9). Animal lifewas not specially abundant in the land; no bears, an occasional wolf, with a number of foxes, white, red, and black, and hares.

"On our arrival most of the birds had already left these regions, so inhospitable in winter, or were seen high up in the air in collected flocks, flying towards the south entrance of Behring's Straits. Still on the 19th October an endless procession of birds was seen drawing towards this region, but by the 3rd November it was noted, as something uncommon, that a gull settled on the refuse heaps in the neighbourhood of the vessel. It resembled the ivory gull, but had a black head. Perhaps it was the rare *Larus Sabinii*, of which a drawing has been given above. All the birds which passed us came from the north-west, that is, from the north coast of Siberia, the New Siberian Islands or Wrangel Land. Only the mountain owl, a species of raven and the ptarmigan wintered in the region, the last named being occasionally snowed up."

Additional observatories were built during the winter, so that there was a regular collection of them on shore. And so with regular work and amusement, and occasional visits to the Chukchis, the winter passed happily; and on April 23, returning spring brought with it the birds in their migration northward, beginning with the snow-bunting, the "sparrow of the north." The bird and mammal fauna of the Chukch Peninsula and north-east Siberia generally, we may say, Baron Nordenskjöld found to be markedly different from those which prevail in other parts of the Arctic Regions. On July 18, 1880 the *Vega* was as suddenly released from the ice as she was caught, and all at once found herself free to pass through Behring Straits, and thus accomplished the North-east Passage. Space prevents us from following the Expedition in their cruise round the rest of the coast of the Old World. The members of the expedition continued their observations up to the last, and even in Japan, China, Ceylon, and other places were able to add something to our existing knowledge. Considerable time was spent in visiting the north-east coast of Asia, the north-west coast of America, and the islands between. The results are much important information on the natural history and geology of those regions, and a long account of our knowledge of the north coast of Asia from the earliest time including the extensive series of Russian voyages of discovery with which the names of Behring, Steller, and others are associated. Of Steller, Baron Nordenskjöld has the highest opinion, as well as of the value of his work in natural history on Behring Island, and his death at thirty-seven years of age, through the jealousy and tyranny of Siberian officials was a cruel loss to science. In these chapters, all that is known to science concerning North Siberia and the neighbouring islands has been carefully epitomised, and will form a valuable manual for future scientific work. In cruising from the Asiatic to the American coast, Baron Nordenskjöld makes a remark which has an important bearing on a recent correspondence in these columns. "As in all the Polar Seas," he states, "of the northern hemisphere, so also here, the eastern side of the Straits was ice-bestrewn; the western, on the other hand, clear of ice." We regret that we cannot enter in detail on the many interesting facts given by Baron Nordenskjöld on the natural history of St. Lawrence, Behring, and other islands between Asia and America. He has collected all the information attainable on Steller's sea-cow (*Rhytina Stelleri*), which on Steller's visit to Behring Island in 1741 was found pasturing in large herds on the abundant sea-weed on the shores of the island. Twenty-seven years after, not a specimen was to be found, and it was believed to be then extinct. But Baron Nordenskjöld adduces evidence to prove that a specimen was seen twenty-seven years ago, though there can be little doubt that it has really gone the way of the mammoth. The Baron does not believe that its extinction is due to the destruction by hunters, but that it was a survival from a past age doomed to extinction, which overtook it when driven from its pastures on the shores of Behring Island.

"*Steller's sea-cow* (*Rhytina Stelleri*, Cuvier) in a way took the place of the cloven-footed animals among the marine mammalia. The sea-cow was of a dark-brown colour, sometimes varied with white spots or streaks. The thick leathery skin was covered with hair which grew together so as to form an exterior skin, which was full of vermin and resembled the bark of an old oak. The full grown animal was from twenty-eight to thirty-five English feet in length and weighed about sixty-seven cwt. The head was small in proportion to the large thick body, the neck short, the body diminishing rapidly behind. The short fore-leg terminated abruptly without fingers or nails, but was overgrown with a number of short thickly placed brush-hairs; the hind-leg was replaced by a tail-fin resembling a whale's. The animal wanted teeth, but was instead provided with two masticating plates, one in the gum the other in the under jaw. The udders of the female, which abounded in milk, were placed between the fore-limbs. The flesh and milk resembled those of horned cattle, indeed in Steller's opinion surpassed them. The sea-cows were almost constantly employed in pasturing on the sea-weed which grew luxuriantly on the coast, moving the head and neck while so doing much in the same way as an ox. While they pastured they showed great voracity, and did not allow themselves to be disturbed in the least by the presence of man. One might even touch them without their being frightened or disturbed. They entertained great attachment to each other, and when one was harpooned the others made incredible attempts to rescue it."

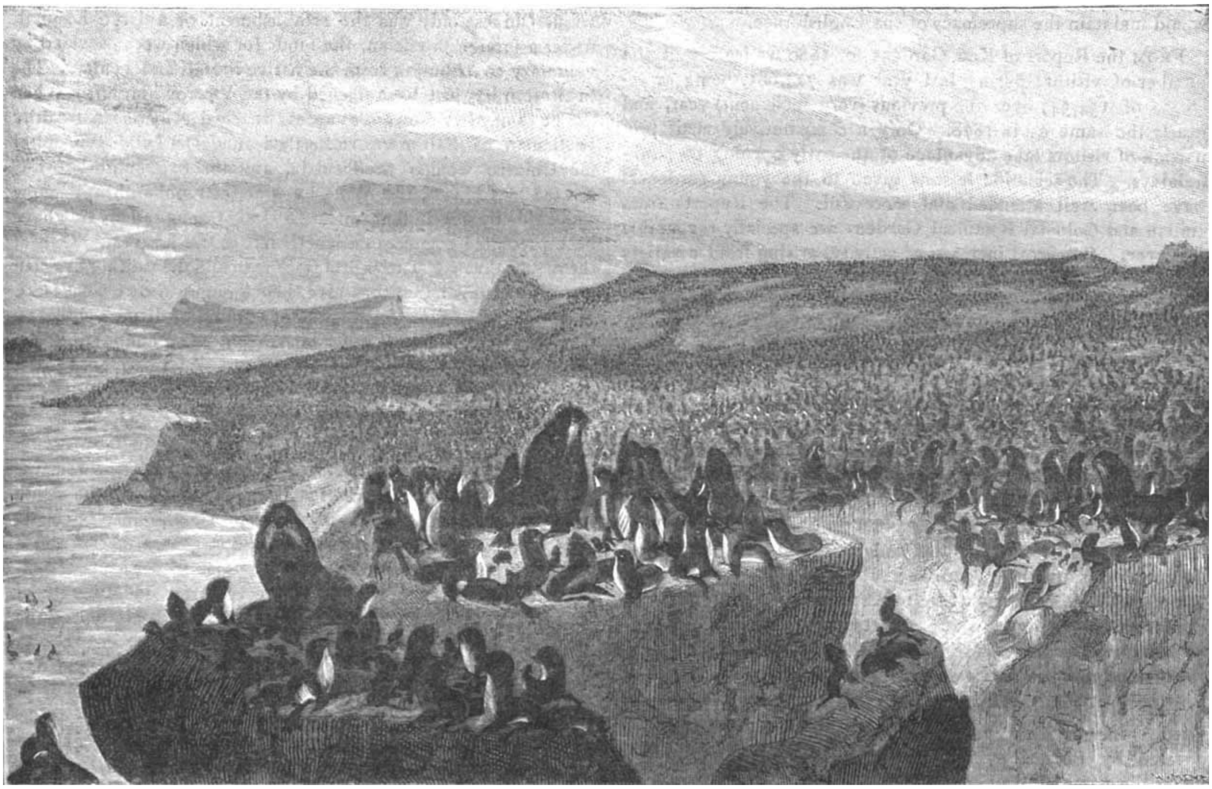

FIG. 11.—"Seal-rookery" on St. Paul's Island, one of the Pribilov Islands.

We give a sketch of the sea-cow (Fig. 10), as also of the "rookery" of the sea-bears, still found in abundance on St. Paul's Island (Fig. 11).

But we must take leave of a work abounding in interest, and in every way worthy of the important expedition of which it is the outcome.